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EXAMINER
RASHID, DAVID

ART UNIT	PAPER NUMBER
2624	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/596,321	CARLSEN ET AL.
	Examiner	**Art Unit**	
	DAVID P. RASHID	2624	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS,
WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>04 October 2010</u>.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-10</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-10</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
         application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail. Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Table of Contents

Amendments & Claim Status

[1]   This Detailed Action is responsive to Response received Oct. 4, 2010. Claims 1-9 remain
pending.

Claim Rejections - 35 U.S.C. § 112

[2]   The following is a quotation of the first paragraph of 35 U.S.C. § 112:

> The specification shall contain a written description of the invention, and of the manner and process of
> making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the
> art to which it pertains, or with which it is most nearly connected, to make and use the same and shall
> set forth the best mode contemplated by the inventor of carrying out his invention.

New Matter

     Claims 1-10 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply
with the written description requirement. The claim(s) contains subject matter which was not
described in the specification in such a way as to reasonably convey to one skilled in the relevant
art that the inventor(s), at the time the application was filed, had possession of the claimed
invention.

     Claim 1, lines 11-13 cite "the registering including selecting at least one further first
landmark in the first image and at least one further second landmark in the second image as a

function of a pre-selected value of the similarity value". However, the specification supports registering includes <u>only</u> selecting at least one further second landmark in the second image as a function of a pre-selected value of the similarity value. See Specification at p. 9, ll. 13-26 and between figs. 3, 4 (showing that only one further second landmark L_6 is selected in the second image, when the first image is fig. 4 and the second image is fig. 5). See also Specification at p. 9, l. 27 – p. 10, l. 10 and between figs. 4, 5 (showing that only one further second landmark L_9 is selected in the second image, when the first image is fig. 5 and the second image is fig. 6).

It is suggested to change to "the registering including selecting ~~at least one further first landmark in the first image and~~ at least one further second landmark in the second image as a function of a pre-selected value of the similarity value".

Claims 8-10 by analogy.

Claim Rejections - 35 U.S.C. § 102

[3]   The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Pardas

[4]   **Claims 1** and **8-10** are rejected under 35 U.S.C. § 102(b) as being anticipated by Pardas et al., U.S. Pub. No. 2003/0048955 ("Pardas").

Regarding **Claim 1**, Pardas discloses a method (fig. 1) of registering a first image (the second-from-top image at fig. 20) and a second image (the third-from-top image at fig. 20), the method comprising the steps of:

selecting, by an image processing device (it is implicit the complex computations are performed by a computer), at least one first landmark (fig. 20, item L1 in copied figure below) in the first image;

selecting, by an image processing device (it is implicit the complex computations are performed by a computer), at least one second landmark (fig. 20, item L2 in copied figure below) in the second image, wherein the at least one first landmark corresponds to the at least one second landmark (items L1 and L2 correspond to each other); and

registering, by an image processing device (it is implicit the complex computations are performed by a computer), the first and second images by using a similarity value (e.g., "if a high gradient component of the signal crosses one edge of this triangle" for the "first criterion" at ¶ 0057; "a triangle of very large size. . .should be segmented. . ." for the "second criterion" at ¶ 0057) which relates to a similarity of a first region (fig. 20, item P1 in copied figure below) determined by the at least one first landmark and a second region (fig. 20, item P2 in copied figure below) in the second image determined by the at least one second landmark,

the registering including selecting at least one further first landmark (fig. 20, item L3 in copied figure below that was segmented from the top image at fig. 20) in the first image and at least one further second landmark (fig. 20, item L4 in copied figure below that was segmented from the second-from-top image at fig. 20) in the second image as a function of a pre-selected value ("In order to select the triangles that have to be segmented, two different criteria may be used" at ¶ 0057, emphasis added) of the similarity value.

Regarding **Claim 8**, Claim 1 cites identical features as in Claim 8, including

a memory (it is implicit the complex computations are performed by a computer containing memory) for storing the first image and the second image; and an image processor (it is implicit the complex computations are performed by a computer containing a processor) for registering the first image and the second image; wherein the image processor is adapted to perform the method-steps of Claim 1. Thus, references/arguments equivalent to those presented above for Claim 1 are equally applicable to Claim 8.

Regarding **Claim 9**, Claim 1 cites identical features as in Claim 9, including

a computer program (it is implicit the complex computations are performed by a computer containing software) on a computer-readable device (it is implicit the complex

computations are performed by a computer) for registering a first and a second image, wherein the computer program causes a processor (it is implicit the complex computations are performed by a computer containing a processor) to perform the method-steps of claim 1when the computer program is executed on the processor. Thus, references/arguments equivalent to those presented above for Claim 1 are equally applicable to Claim 9.

　　　Regarding **Claim 10**, Pardas discloses wherein the selecting the at least one further first landmark in the first image and the at least one further second landmark in the second image is based on the similarity value not exceeding the pre-selected value (the similarity value cannot meet for than the "two different criteria" used at ¶ 0057)
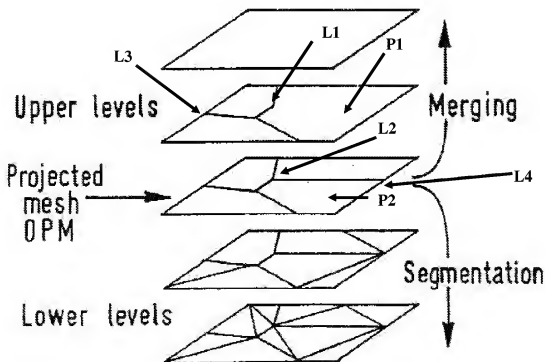

FIG.20

Erdem

Remarks Persuasive

[5]   Response at 2 and 3 regarding rejected Claims 1 and 8-10 under 35 U.S.C. § 102(b) as

being anticipated by Erdem et al., U.S. Pat. No. 5,982,909 ("Erdem") have been respectfully and

fully considered, and is found persuasive. The Examiner has clarified the rejection below.

[6]   **Claims 1** and **8-10** are rejected under 35 U.S.C. § 102(b) as being anticipated by Erdem

et al., U.S. Pat. No. 5,982,909 ("Erdem").

        Regarding **Claim 1**, Erdem discloses a method (fig. 20; 17:40-67) of registering a first

image (fig. 20b image) and a second image (fig. 20c image), the method comprising the steps of:

        selecting, by an image processing device (fig. 1, item 2), at least one first landmark (e.g.,

the middle point in fig. 20b, node item 121) in the first image;

        selecting, by an image processing device (fig. 1, item 2), at least one second landmark

(the corresponding middle point in fig. 20c to the middle point in fig. 20b) in the second image,

wherein the at least one first landmark corresponds to the at least one second landmark (the

middle points of both figs. 20b, c correspond to each other); and

        registering, by an image processing device (fig. 1, item 2), the first and second images by

using a similarity value (fig. 2, hexagonal search item 50; "the position of G 51 that minimizes

the MAD or MSE value is registered" at 11:5-23, emphasis added) which relates to a similarity

of a first region (a corresponding triangle block in fig. 20b to the middle point) determined by the

at least one first landmark and a second region (a corresponding triangle block in fig. 20c to the

middle point) in the second image determined by the at least one second landmark,

        the registering including selecting at least one further first landmark ("new inside and

boundary nodes" at 17:40-67; any node of fig. 20b not included in a previous lower resolution

image, support by "Once step 50 is completed with high-resolution nodes in the mesh 121, still

higher resolution nodes can be added to the mesh 121 and step 50 then repeated any number of

times" at 17:43-56) in the first image and at least one further second landmark ("new inside and

boundary nodes" at 17:40-67; any node of fig. 20c not included in fig. 20b) in the second image

as a function of a pre-selected value (fig. 2, item 50; "The mean absolute difference (MAD) or

mean square difference(MSE), formulated in equation 18" at 11:5-23) of the similarity value.

        Regarding **Claim 8**, Claim 1 cites identical features as in Claim 8, including

a memory (fig. 1, item 2) for storing the first image and the second image; and an image processor (fig. 1, item 2) for registering the first image and the second image; wherein the image processor is adapted to perform the method-steps of Claim 1. Thus, references/arguments equivalent to those presented above for Claim 1 are equally applicable to Claim 8.

Regarding **Claim 9**, Claim 1 cites identical features as in Claim 9, including

a computer program ("software programs" at 3:10-37) on a computer-readable device (fig. 1, item 2) for registering a first and a second image, wherein the computer program causes a processor (fig. 1, item 2) to perform the method-steps of claim 1when the computer program is executed on the processor. Thus, references/arguments equivalent to those presented above for Claim 1 are equally applicable to Claim 9.

Regarding **Claim 10**, Erdem discloses wherein the selecting the at least one further first landmark in the first image and the at least one further second landmark in the second image is based on the similarity value not exceeding ("the position of G 51 that minimizes the MAD or MSE value" at 11:5-23cannot exceed the MAD or MSE value) the pre-selected value.

Claim Rejections - 35 U.S.C. § 103

[7]   The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Pardas in view of Moshfeghi

[8]   **Claim 7** is rejected under § 103(a) as being unpatentable over Pardas in view of Moshfeghi, U.S. Pat. No. 5,633,951 ("Moshfeghi").

Regarding **Claim 7**, Pardas does not disclose wherein the method is applied in medical imaging to one of CT data sets, MRI data sets, PET data sets, SPECT data sets, and ultrasonic imaging data sets.

Moshfeghi teaches registration of elastic volumetric images by matching surfaces (2:46-56; e.g., fig. 4) that includes applying in medical imaging to one of CT data sets, MRI data sets,

PET data sets, SPECT data sets, and ultrasonic imaging data sets (4:9-37). Pardas and

Moshfeghi are combinable because they are from the same field of endeavor and similar problem

solving area.

Regarding **Claim 7**, Erdem does not disclose wherein the method is applied in medical

It would have been obvious to one of ordinary skill in the art at the time the invention

was made for the method of Pardas to be applied in medical imaging to one of CT data sets, MRI

data sets, PET data sets, SPECT data sets, and ultrasonic imaging data sets as taught by

Moshfeghi "to entirely automate the entire contour extraction process using built in knowledge

of the anatomy of the body region scanned, the present best mode of implementing the contour

extraction process involves user interaction." Moshfeghi at 5:36-51. Therefore, it would have

been obvious to combine Moshfeghi with Pardas to obtain the invention as specified in Claim 7.

Erdem in view of Moshfeghi

[9]   **Claim 7** is rejected under § 103(a) as being unpatentable over Erdem in view of

Moshfeghi.

Regarding **Claim 7**, Erdem does not disclose wherein the method is applied in medical

imaging to one of CT data sets, MRI data sets, PET data sets, SPECT data sets, and ultrasonic

imaging data sets.

Moshfeghi teaches registration of elastic volumetric images by matching surfaces (2:46-

56; e.g., fig. 4) that includes applying in medical imaging to one of CT data sets, MRI data sets,

PET data sets, SPECT data sets, and ultrasonic imaging data sets (4:9-37). Erdem and

Moshfeghi are combinable because they are from the same field of endeavor and similar problem

solving area.

It would have been obvious to one of ordinary skill in the art at the time the invention

was made for the method of Erdem to be applied in medical imaging to one of CT data sets, MRI

data sets, PET data sets, SPECT data sets, and ultrasonic imaging data sets as taught by

Moshfeghi "to entirely automate the entire contour extraction process using built in knowledge

of the anatomy of the body region scanned, the present best mode of implementing the contour

extraction process involves user interaction." Moshfeghi at 5:36-51. Therefore, it would have

been obvious to combine Moshfeghi with Erdem to obtain the invention as specified in Claim 7.

Allowable Subject Matter

[10]   Claims 2-6 would be allowable if rewritten (i) to overcome the rejection(s) under 35
U.S.C. § 112, first paragraph; and (ii) in independent form including all of the limitations of the
base claim and any intervening claims to overcome the objection to as being dependent upon a
rejected base claim.

Reasons for Indicating Allowable Subject Matter

[11]   The following is a statement of reasons for the indication of allowable subject matter:

Regarding **Claim 2**, while the prior art of record teaches claim 1, the prior art of record
does not teach wherein the second number is the first number plus one; wherein the first and
second landmarks are selected in accordance with a qualifying function, and wherein the third
number is equal to the second number.

Conclusion

[12]   Any inquiry concerning this communication or earlier communications from the
examiner should be directed to DAVID P. RASHID whose telephone number is (571)270-1578
and fax number (571)270-2578. The examiner can normally be reached Monday - Friday 7:30 -
17:00 ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's
supervisor, Bhavesh Mehta can be reached on (571) 272-74537453. The fax phone number for
the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent
Application Information Retrieval (PAIR) system. Status information for published applications
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like assistance from a USPTO Customer Service Representative or access to the automated
information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David P. Rashid/
Examiner, Art Unit 2624

David P Rashid
Examiner
Art Unit 26244